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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,323	05/09/2005	Jin Soo Seo	2167.008US1	4880

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SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER

BITAR, NANCY

ART UNIT	PAPER NUMBER
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2624

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05/13/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/534,323	Applicant(s) SEO ET AL.	
	Examiner NANCY BITAR	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/29/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's response to the last Office Action, filed 10/31/2008, has been entered and made of record.

2. Claims 1-15 are currently pending.

3. Applicants arguments filed 01/29/2009 have been fully considered but they are not persuasive.

4. Applicant argues that Chen discovered that even when the Fourier-Mellin transform is improved by using the FMI-SPOMF the results are poor in certain application. Examiner confirms that Chen teaches page 1159 right column, lines 12-54 that the FMI-SPOMF requires several direct and inverse Fourier transform and the discrete implementation must be done with care to avoid artifacts and have a much more efficient implementation (see also Chen page 1166, VIII conclusion) . Moreover, the discrimination power could probably be improved by appropriate image enhancement in order to have a better fingerprint recognition.

Applicant argues that Sharma and the potential viability of using a Fourier-Mellin transform to identify fingerprints in audio applications are not supported by evidence in the record. Further, the Applicant was unable to find anything within the bounds of Sharma that

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teaches how one should apply the Fourier-Mellin transform to an audio signal - so that reliable results would be obtained, Examiner disagree with applicant since he uses the Chen reference to teach and will emphasize more in the rejection below. Chen clearly teaches matching a two dimensional image to a translated, rotated and scaled reference image by using Fourier-Mellin invariant (FMI) descriptor for each image to be matched, and the matching of the FMI descriptors. The FMI descriptor is translation invariant, and represents rotation and scaling as translations in parameter space. The performance of the FMI-SPOMF algorithm is the same or similar to that of the phase-only matched filtering when dealing with image translations. Moreover, Chen advantage is to match rotated and scaled images accurately and efficiently. The innovation is the application of the SPOMF to the FMI descriptors, which guarantees a high discriminating power and an excellent robustness in the presence of noise and the application can be used for various applications in medical imaging, remote sensing, fingerprint recognition, and multiobject identification. Sharma teaches the use of perceptual features in order to overcome the issue of robustness. It is well known in the art to transpose image processing techniques to audio and vice versa.

As to Legal Precedent, applicant states general requirement of 103 rejection such as the burden of establishing prima facie case of obviousness falls on the examiner, some reason for combination other than the hindsight gained from the invention itself and non analogous art cannot properly be pertinent prior art. So far, the claim rejection meet on the requirement as applicant listed on page 5 of the Remarks.

As to No Reason to Combine References, applicant argues that the examiner has not shown the requisite motivation or suggestion to modify or combine the Chen, Sharma and

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Pareira references to reach the presently claimed technique. Examiner disagrees with applicant because Chen clearly teaches a method for extracting a fingerprint from an image (audio signal or multimedia signal) by extracting robust perceptual features (translated, rotated, and scaled images) and subjecting them to a Fourier Mellin transformation. It is true that Chen deals with image processing while this application deal with audio signal processing thus it is obvious to use transpose image processing techniques to audio and vice versa .

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

As to The Reference Teach Away, applicant argues that the digital watermarking taught by Sharma and the fingerprint recited in the claims of the application are two different things. However, Examiner did not use Sharma reference to teach that feature sequence is a fingerprint and instead used the Chen reference that teaches the fingerprint recognition in section C where the FMI-SPOMF is used to recognize the fingerprint by matching fingerprint minutia with respect to the Fourier-Mellin transformation. Examiner disagrees with applicant this point of view because the Sharma reference teaches image techniques and the use of Chen reference helps in transposing the image technique taught by Sharma to the audio signal taught by Chen.

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All remaining arguments are reliant on the aforementioned and addressed arguments and thus are considered to be wholly addressed herein.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (Symmetric phase-only matched filtering of Fourier-Mellin transforms for image registration and recognition) in view of Sharma et al (US20040128512) and further Pareira et al (template based recovery of Fourier based watermarks using log polar and log-log maps) .

As to claims 1 and 2, Sharma et al teaches a method of extracting a fingerprint from a multimedia an audio signal, the method comprising the steps of:

extracting a set of robust perceptual features from the audio signal (image data 400); subjecting the extracted set of features to a Fourier-Mellin transform to compensate for speed changes in the audio signal (transform image data, 402, figure 11, The detector segments the target image into blocks (e.g., 600, 602) and then performs a 2 -dimensional Fast Fourier transform (2D FFT) on several blocks. This process yields 2D transforms of the magnitudes of the image contents of the blocks in the spatial frequency domain as

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depicted in the plot 604 shown in FIG. 12, note that A Fourier Mellin transform is one of many remapping transforms that can be used with the present invention, paragraph [0144]); While Sharma meets a number of the limitations of the claimed invention, as pointed out more fully above, Sharma fails to specifically teach subjecting the extracted set of features to a Fourier Mellin transform and convert the transformed set of features into a sequence constituting the fingerprint. . Specifically, Chen et al fingerprint recognition (section C, page 1165) where the FMI-SPOMF is used to recognize the fingerprint by matching fingerprint minutia with respect to the Fourier-Mellin transform. Chen et al clearly teaches the method for extracting a fingerprint from an image (multimedia signal) by extracting robust perceptual features (translated, rotated, and scaled image) and subjecting them to Fourier Mellin transform. Chen and Sharma uses image processing whereas the claim teaches an audio signal processing which is well know to transpose image processing techniques to audio. It would have been obvious to one of ordinary skill in the art to use the audio parameter with the Fourier transform of Chen in order to have a high discriminating power and excellent robustness in the presence of noise. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

While Chen and Sharma teaches the limitation above. Neither Chen nor Sharma teaches the log or the log polar mapping. Pareira et al. teaches a method as claimed in claim 1, wherein said converting step includes converting the magnitudes of the Fourier-Mellin transform (see section 4.4, magnitude of the FFT, pages 3-5). Because transferring the magnitude of the Fourier-Mellin transform renders the method robust against rotation scaling or aspect ratio changes. It would have been obvious to one of ordinary skill in the art to include the magnitude algorithm in Fourier transform of Chen et al in order to overcome the sampling problem and maximizing the number of points matched between the known template and the image.

Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 3, Chen et al teaches the method as claimed in claim 1, wherein said converting step includes converting a derivative of the phase of the Fourier-Mellin transform. (pages 1162-1167)

As to claim 4, Pereira et al. teaches a method as claimed in claim 1, wherein Fourier-Mellin transform includes a one-dimensional log mapping process being applied to the set of perceptual features (see section 2.1 and 4.4).

As to claim 5, Pereira et al. teaches method as claimed in claim 1, wherein the audio signal forms part of an image or video signal and said Fourier-Mellin transform includes a two-dimensional log-polar mapping process being applied to the set of perceptual features (see section 4.1, log-polar mapping , page 3).

As to claim 6, Pereira et al. teaches method as claimed in claim 1, wherein the audio signal forms part of an image or video signal and said Fourier-Mellin transform includes a two-dimensional log-log mapping process being applied to the set of perceptual features (section 4.2, log-log mapping, page 3, see also section 4.4).

As to claim 7, Chen et al teaches the method as claimed in claim 1, wherein said extracting includes normalization of the set of perceptual features (abstract, section B and C)

Claims 8- 15 differ from claims 1-7 only in that claims 1-7 are method claim whereas, claims 8-15 are an apparatus claim. Thus, claims 8-15 are analyzed as previously discussed with respect to claims 1-7 above.

Conclusion

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nancy Bitar/
Examiner, Art Unit 2624

/Vikkram Bali/
Supervisory Patent Examiner, Art Unit 2624